Volunteer Firemen

NOVEMBER

1940

NATIONAL FIRE PROTECTION ASSOCIATION
INTERNATIONAL
60 Batterymarch Street Boston, Massachusetts

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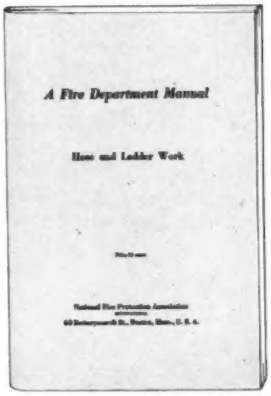

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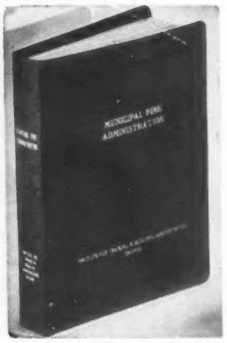

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Volunteer Firemen

Volume 7 Number 11

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THE cover picture is a closeup view of the fire in the gasoline tank truck described on page 5.

THE largest fire so far this year occurred in September in the plant of the Crown Cork and Seal Co., Inc., of Baltimore. One hundred and fifty thousand bales of cork in the storage yard of this plant were destroyed together with two large storage buildings and nine railroad cars. The value in cork burned alone was some $780,000 and the total loss will probably approach a million dollars.

The bales averaged about 150 pounds each and some 2½ feet in each dimension. It was "waste" cork, irregular pieces about 1½ inches thick and several inches long. Cork is so light that the flying brand hazard is unusually high, and a fire involving baled cork may be compared with a fire in kindling wood similarly arranged.

The way the cork was stored certainly threw all caution to the winds. Some 10,000 tons were crowded into a 9-acre yard. Individual piles covered areas 50 by 40 feet and 30 feet in height. Common sense would have suggested some reasonable clearances between such huge piles of quick-burning material, but aisles were only about 3 feet wide in some places. Thirty per cent or more of the cork was inside the two storage buildings destroyed.

Fire departments cannot be expected to perform miracles. Yet it would take a miracle to control a fire where so much to burn had been piled up in one place. Short-cuts were perhaps justified in the minds of those in charge by the reported possibility that supplies of the cork, an imported material, might be cut off by the war. The fire may be of some value as an object lesson in what happens when fundamentals of fire safety are ignored.

Five large piles of cork were burning when the first fire companies arrived. For over seven hours the fire department fought an uneven battle with the flames. The storage buildings destroyed extended some 455 feet through the center of the property with the piles of cork on both sides of them. To make any impression at all on such a fire, a tremendous amount of water is required. In all some 50 hose streams, mostly of large calibre, were employed. In its early stages, by means of flying brands, the fire jumped over the warehouses so that piles were on fire on both sides of the buildings that were leveled. The fire department saved the million dollar cork grinding building at the south end of the plant. This building was fire resistive, sprinklered and there was a firewall on the side toward the fire. Here the fire department had a chance to make a stop, although the indiscriminate piling of cork made the exposure severe.

The fire department lost 2,500 feet of hose due to the rapid spread of the fire as well as some ladders and other equipment. Twenty-three firemen were injured, and 50 others received first aid treatment.

Six regular and 9 additional special alarms were sounded for the fire. The total fire department response was 45 engine companies, 11 ladders, 1 chemical, and 1 water tower. Protection was maintained in the rest of the city by the response of the off-shift which manned 17 reserve engines, 6 ladders and 1 chemical, in addition to 17 other engines, 15 ladders, 5 high pressure and 3 chemical companies of the regular force not called to the fire.

THE volunteer fire department of Lansdowne, Maryland, will be hosts to the convention of the Baltimore Volunteer Fire Association next year. For this purpose particularly, and as a hobby for the future, they propose to collect fire souvenirs of which an exhibit can be made. They ask that small objects of interest from fires be sent them for this exhibit. These will be marked indicating what fire company sent them and the story that goes with them will be set down. They will be received gratefully by W. W. Robinson, President, Lansdowne Volunteer Fire Association No. 1, Lansdowne, Maryland.

AT the state convention at Lewistown, Pa., in October, the assistant chief of the Bellefonte fire department was killed when a ladder being demonstrated broke.

Chief George Carpeneto of Bellefonte thinks it possible some of those present took pictures which would help his department in the investigation they are making of the accident and requests any such be sent to him.

LAST month 8 departments with 84 men joined the Volunteer Firemen's Section for the first time. In addition 46 departments with 1,003 men renewed membership. This makes the total enrollment 682 departments and 14,540 men. The following departments are newly enrolled:

San Pablo Fire Department, San Pablo, California.

Jaffrey Centre Fire Department, Jaffrey, New Hampshire.

Ronkonkoma Fire Department, Lake Ronkonkoma, New York.

Wade Hose Company, Jefferson, Ohio.

Aluminum Company of America, Alcoa, Tennessee.

Logan Fire Department, Logan, West Virginia.

Parsons Fire Department, Parsons, West Virginia.

Wisconsin Veterans Home Fire Department, Wisconsin Veterans Home, Wisconsin.

THE estimated U. S. fire loss for September, 1940, according to the National Board of Fire Underwriters is $21,198,000. This figure is based on notices of incurred loss received by insurance companies, members of the board, plus an allowance for unreported and uninsured losses. Losses for the first nine months of 1940 are slightly less than losses for the same nine months of 1939. The following table shows the losses for these months of 1939 and 1940:

	1939	1940
January	$27,615,316	$36,260,650
February	29,303,520	34,410,250
March	30,682,168	29,788,800
April	27,061,522	26,657,190
May	27,031,700	23,446,590
June	24,190,700	19,506,000
July	22,468,304	20,322,800
August	22,800,500	20,722,100
September	22,837,250	21,198,000
Total 9 months	$233,990,980	$232,312,380

FIRE ON QUEER STREET

It's a business with some people, a hobby with others, but the arson hunters always catch up with them

by J. C. Furnas

Digested with permission from *ESQUIRE*, the Magazine for Men.

THE volunteer firemen from the local town did their best. But the old farmhouse was obviously doomed to become one of those blackened cellarholes that you often see in the country, the grave of a house with the chimney for elongated tombstone. The elderly owner was pitiful in his despair. Twice the horrified onlookers had to hold him back from rushing into the flames to commit suicide.

When there was nothing more to do but watch, one of the firemen got into the lee of the boarded-up barn for shelter from the wind. The first time he heard that cockeyed little hiccup, he thought he was just imagining things. Fifteen minutes later he heard it again, too plain for dreaming. So he dropped a word in the chief's ear and the chief sent a couple of men round back to break into the barn.

It proved to be stacked with all the furniture, bedding, clothing and kitchen stuff that were supposed to be burning up in the house to the utter devastation of the poor old owner. He had shifted it all there himself just before setting the fire that was to collect his insurance and ease the struggle for existence. He might well have got away with it—if he had only thought to stop the cuckoo clock after taking it to the barn. Because the sound of "Cuckoo!" had startled the chilly fireman as he leaned against the barn wall, the owner got his wish for a long stretch of freedom from economic worries—but in state's prison at the taxpayers' expense.

That case puts the emphasis where it belongs—on the peculiar trickiness and temptingness of the crime of arson, which make it a regular business for some people and a regular habit with others. It sounds so easy. Any fool ought to be able to set a delayed blaze, establish an alibi and trust to the fire itself to cover his tracks. Some fools — and maniacs — are still trying. But a weird little slip, that neither you nor a fool would ever think of, that trained arson hunters themselves may not think of till their sharpened instincts find it, usually crops up to show that the fire was incendiary and who set it. A generation ago arson often escaped the law's attention because arson detection was still clumsy and ill-organized and the law itself gave arsonists undeserved breaks. Nowadays all that is changed or changing. "This used to be a good racket," said a professional "torch" recently while cooling his heels in jail; "I always figured it was the one thing you could get away with. But not no more. From here out I stick to larceny."

Naturally there will always be arson, just as there will always be theft and murder. But every year that passes, the chances of getting away with it are fewer—thanks largely to the development of an intricate network of highly trained, uncannily shrewd special agencies, public and private, that smell out incendiary burnings and build watertight cases against the people who set them—cases that the local district attorney is only too delighted to lay before a jury. In a steadily growing list of states and counties, trained investigators with the patience of cats watching at mouseholes, the nose for evidence of a fiction detective and the systematic omniscience of the U. S. Bureau of Census, are now making the firebug's life miserable. Such operatives, usually attached to the state police or the fire-marshal's office, head up a dragnet system that includes most local fire chiefs and firemen, well educated in what to look for and why, obligated by law to report to headquarters all conceivably pertinent circumstances of every fire that occurs.

The net result is that, wherever a fire occurs in the United States, the firemen are suspicious from the word go—watching for abnormal colors in smoke, looking out for inexplicable explosions, sniffing for the telltale scent of kerosene, peeling an eye for the quick spread of flame, the wrong expression on a bystander's face, the missing furniture that may mean this fire has broken out on Queer Street.

No wonder arson has been on the down-grade. There are no figures because only a clairvoyant could be sure how many of the year's crop of fires are incendiary. But crack states like Pennsylvania can now count on getting convictions in at least 70 per cent of all arson cases that grand juries indict. One of their investigators recently convicted twenty-three out of twenty-four.

To get the full drama out of arson-hunting, you must know something about the law of arson. Before the Model Arson Law—now adopted or approximated by most states—it was a crime against the state to burn *somebody else's* property, but not your own. That stemmed back to the old English common law before there were any insurance companies to defraud. So the old farmer with the cuckoo clock, for instance, could have been prosecuted only for attempted fraud on the insurance company. With juries feeling as they often do about arguments between little fellows and big, soulless, dime-shaving corporations, he would have stood a fair chance of getting clear in court. But the Model Arson Law makes willful burning of your own property, if insured, an offense against the state, just like any other felony. That brought things up to date, recognizing criminal hazards to firemen, other buildings and public safety in general, and cleared the legal decks for doing a job on the insurance-burning temptation.

The arson-hunter has to rely on his super-sensitive nose for suspicious detail to weave round the accused a web of mute, but damaging, circumstantial proof that the judge will admit and the jury feel confidence in. Very pretty work it often is. The lard pail that contained the incendiary gasoline is traced by its serial number to a grocery that sold six such empty pails to a suspect in a town near the fire. Seven men were convicted in that case. The holes bored in the walls to increase the draft match up with microscopic markings on a brace-and-bit found in the suspect's possession. The fellow behind that committed suicide before the trial. In some states, where courts recognize the principle of "exclusive opportunity," reliance on circumstantial evidence is carried so far that the owner of the burned premises goes to jail on proof that the fire was incendiary and he alone has access to the premises.

Although professional "torches" probably start the majority of our incendiary fires, there is no lack of other schools of arson. There are plenty of pyromaniacs—people with a shingle off whose yen for fire and clanging bells is likely to come on with the full moon and is usually tied up with a warped sex life. Revenge- and spite-burners. Thieves and murderers who set fires to destroy evidence of crime. Businessmen

who burn out their competitors. Contractors firing buildings to get the rebuilding jobs, laborers who want the job of cleaning up the ruins. So the arson-hunter early gets over being surprised at anything. A girl pyromaniac sets fire to her own home four times running and then sends herself a threatening letter to avert suspicion. A professional fireman, proud of his job, sets fires in small towns so he can appear on the scene and boss round the local volunteer department. A farmhand burns down his former employer's barn because he never got his last $7.50 in wages. A farmer burns out a neighbor because the neighbor hired the arsonist's former housekeeper and he wants her back.

Experts agree with the layman that there must be something wacky about all such people. After all, the crime and the motive are screwily disproportionate. Although the pyromaniac alone is medically and legally loony, arson investigators are usually well enough educated in criminology to know that the dimwit amateur arsonist is more to be pitied than punished and make every effort to get him stowed away in an institution for the mentally unfit rather than in a penitentiary.

Depressing as it sounds, humor does occasionally crop up to lighten the picture. There was the insurance burner who tried to establish an unimpeachable alibi by taking a policeman-friend to a hockey game the night his house was touched off. The son of a local volunteer fire chief who recently burned down half the town to give the department a chance to use a new piece of equipment. (Volunteer departments are occasionally astounded to find firebugs among their members, enlisted on account of their passion for the big, red wagon and the billowing smoke.) The thirsty fireman who tasted the contents of a punch bowl he found in a half-burned house and got a mouthful of gasoline. The romantic-minded lad who fired his girl-friend's house so he could become a hero by rescuing her.

Nothing much distinguishes the professional firebug from any other sulky-looking professional criminal, except his preference for what used to be a relatively safe line of felony. Like other criminals, he knows the value of organization and often belongs to a mob that includes not only skillful firesetters, but salesmen to hunt out and sign up prospects and go-betweens to carry messages because phones and letters are a trifle risky.

Some of the abler and more successful organizers of torch-rings have graduated into that profession from the ranks of "public adjusters." That business started in large cities to handle

On Route 10 between Dover and Morris Plains, New Jersey, this tank truck took fire igniting its load of 2,000 gallons of gasoline. The driver turned the truck off the highway before leaving it when the parking brake failed to hold. See also front cover.

collections on fire losses for suspicious or bewildered people who were frightened by the long clauses in their insurance policies and were easily persuaded that a specialist could do more for them than an ordinary lawyer. The "adjuster's" fee was usually a contingent percentage of the amount collected. It was easy money and the profession soon became badly over-crowded. Eventually it occurred to enterprising public adjusters that, since there weren't enough on-the-level fires to go round, it behooved them to manufacture their own supply.

Percentages and rates vary widely in this fire-manufacturing industry. Ten per cent is often asked by torch mobs directly. An eminent New England firebug recently asked that percentage of a prospect who wanted a small hotel burned out, and was told ten per cent of $15,000 was far too much. Later the torch-leader found that a small-time competitor had arranged to do the job for $300. Irate at being so badly underbid by a mere punk, he tipped off the police with the result that the underbidding mob and the owners too all went to jail for long terms. Way down at the other end of the scale, a local dimwit in a small town in Maine is now serving a long stretch in jail for setting two fires for pay—net proceeds to him being precisely $25 for both jobs. The only basis is what the traffic will bear.

Experts say it is impossible to exaggerate the importance of such a heads-up attitude among the boys who ride the red wagons. The modern fire department is armed with cameras to shoot quick evidence of the trail of gasoline-soaked newspaper in the hallway that was visible only a few minutes before the walls caved in. With special tight-sealed cans and sponges for mopping up and preserving any inflammable liquids found where they shouldn't be. With "atmosphere-preservers"—portable chambers into which the air inside a burning house can be pumped to be investigated at leisure by the laboratory for traces of funny business. And, it goes without saying, with a rousing distaste for firebugs that needs no stimulus to make sure firemen will co-operate with arson-hunters like the zeal of small boys playing cops and robbers. For, after all, every incendiary fire means that some fire-crew have to risk their lives unnecessarily. You don't need to impress the scaliness of arson on a fireman whose pal saw funny little beads of fire popping out of a plaster ceiling, investigated with a plaster-hook and was buried under a flood of blazing kerosene.

Naturally, church-robbing or grave-robbing would mean nothing to an arsonist. For loathsomeness, as firemen and your own instincts will tell you, the sane ones rate right along with dope-peddlers and white slavers. The old country judge made that clear when the attorney defending a professional firebug who had burned a big dairy for cash asked for leniency on the grounds that no human lives had been lost—just forty-eight cows fried to death. "That's all very well, Mr. Attorney," said the judge, "but who's going to speak for them cows? If nobody else does I will," he said, leaning over the bench and fixing the arsonist with a cold blue eye: "Five to seven years in state's prison."

British-Combine

A group of auxiliary firemen in London who tackled and successfully extinguished forty incendiary bombs within their district. Bucket hasd pumps with thirty-foot lengths of hose are the principal fire fighting equipment carried by the men.

British-Combine

"Snuffers" to extinguish incendiary bombs by smothering them. These "snuffers" are made of a wire mesh sprayed both inside and out with asbestos fibre. They are called the latest device for dealing with incendiary bombs.

INCENDIARY BOMBS

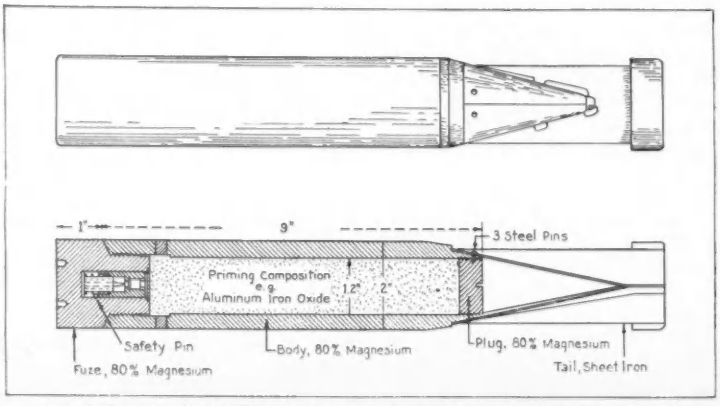
What the British Fire Fighters Have Learned About Them

AS this is written, German airplanes for more than a month have been intensively attacking English cities. Incendiary bombs have been used, but there is no reliable information yet as to how decisive a factor they have been. Much of the damage has probably been due to explosive bombs, and most of the fires have destroyed buildings which would be subject to complete destruction if a fire started in them from any cause, even normal ones. Typical of such buildings are dock warehouses which provide no natural barriers to the unlimited spread of flames.

There is considerable information about some of the types of incendiary bombs being used as British publications have outlined detailed instructions to the public on how to deal with these devices. What is said here is necessarily based on interpretation of the pictorial evidence available, plus what is published for the information of the general public.

When a fire starts from any cause, it will spread if there is combustible material around it. The fire will spread from one end of a building to another if there are passageways or open areas through which it may spread. The fire will spread from floor to floor through stairways or other vertical openings until it involves a whole building. Fire will spread from building to building where the buildings are close together and where the fire may pass from the window openings in one building through the window openings of nearby buildings, even if the walls are of incombustible construction. Where buildings of combustible construction are built close together, fire spreads readily, by direct contact. Such is the experience which we have had in this country over and over again in conflagrations. Incendiary bombs attempt to take advantage of these factors as well as the fact that fires set by incendiary bombs enable raiding planes to see their targets.

The number of explosive bombs that can be carried in the racks of a bombing plane is not large. It is usually well under 50 in number. On the other hand, a common type of incendiary bomb weighs only a little over 2 pounds of which a single bomber can carry 2,000.



A typical bomb of the "Electron" type as described in Air Raid Precaution Handbook No. 9 of the British Government. This one weighs one kilogram (a little over two pounds) and is made principally of magnesium.

THIS small incendiary bomb is known as the Electron bomb. It makes use of a thick shell of an alloy 80 percent of which is magnesium. This shell is approximately 10 inches in length and 2 inches in diameter and contains within it several ounces of a thermite mixture. Unlike thermite type incendiary bombs used unsuccessfully during the last World War, the thermite serves only to ignite the magnesium shell. It is not the main incendiary material.

This bomb does not explode when it hits the ground or some other object. The thermite mixture inside consists of iron oxide and powdered aluminum. Upon ignition, the powdered aluminum and iron oxide react violently, producing molten iron and liberating tremendous amounts of heat. The chemical reaction is as follows:

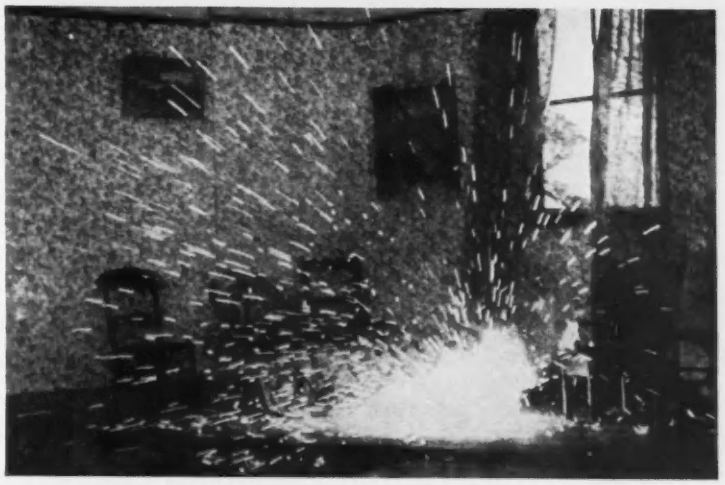
$$8Al + 3Fe_3O_4 = 4Al_2O_3 + 9Fe$$

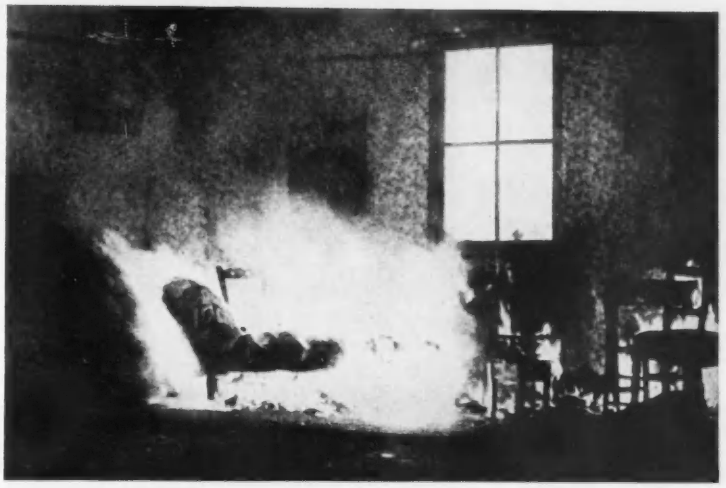
On impact and ignition, the thermite reaction goes on violently for nearly a minute. Temperatures of over 4500 degrees Fahrenheit are developed. Jets of flame emit from vent holes in the shell of the bomb and bits of molten metal are forced through these holes to scatter in every direction for a distance of about 50 feet. This scattering of incendiary material ends when the thermite reaction has been completed and the pressure within the bomb has been decreased. However, by that time the magnesium shell has been ignited and will burn for ten or fifteen minutes at a temperature of nearly 2400 degrees Fahrenheit and it will set fire to any combustible material in the vicinity.

Bombs similar in operation and larger in size are also used, presumably for hitting important military objectives. Such bombs are reported to range in weight from approximately 5 to 60 pounds.

Another type of bomb that has been used to a considerable extent is called a "multiple effect" bomb and is employed against specific and important targets. This bomb contains numerous separate incendiary units of either magnesium or phosphorus which are thrown by explosives from the bomb upon impact and which scatter over a wide area. A common bomb of this type weighs something over 25 pounds.

Compared to magnesium compounds, phosphorus is a rather ineffective incendiary agent. It has been reported, however, that the British have saturated a card, the dimensions of which are small enough to fit in the palm of the hand, with a mixture of guncotton and phosphorus. As long as the cards are kept moist, they can be safely handled. As they dry out, they burst into flame. Such cards dropped over fields of grain, forests, or cities or villages with combustible roofs, might be





Three views of the burning of a typical incendiary bomb of the electron (magnesium) type. The top picture shows it 15 seconds after ignition. The spattering is due to the priming composition (thermite). The middle picture was taken after only 45 seconds. The intense heat of the bomb has set a brisk fire in the surrounding combustibles. At the bottom a householder is extinguishing the bomb in the manner recommended by the British authorities. She is using a stream supplied from the assembly consisting of a hand pump, bucket and 30 feet of small hose. The water knocks down the fire around the bomb and accelerates its burning. For best results a spray is recommended. All views from Air Raid Precaution Handbook No. 9, British Government.

Pictures, Inc.

A London street scene following a bombing raid which shows debris obstructing operations of firemen. Fire apparatus with a ladder can be seen in the rear of the picture. At the left center may be seen flames from a broken gas main. As long as the gas is burning there is no danger of explosion.

expected to start a large number of fires.

The 2 pound Electron type bomb is the one which has apparently been most widely used. It is the only one on which there is any accurate information. Although a bombing plane can carry from 1,000 to 2,000 of these small bombs, the number of fires that they will be able to set is not necessarily 1,000 or 2,000. Looking at a city from the air, it will be observed that a very large proportion of the city limits include open spaces, streets, yards, parks and other areas which are not built on. Probably not more than 15 per cent of the average community is built over.

The Electron type bombs are not dropped singly as at a definite target. They are dumped from their containers, more or less indiscriminately, usually ten or twenty at a time. If, therefore, 150 out of 1,000 actually hit buildings, the bombing might be considered successful. Experience has also indicated that at least half of the bombs that hit buildings would glance off the roof or fail to penetrate because of roof construction. It might be assumed that with good bombing, 1,000 of these 2 pound incendiary bombs would actually start some 75 fires.

Another thing that must be considered is that the area over which these 75 fires will be scattered would depend upon the speed and height at which the plane was flying and the distance covered while it was dropping its bombs. At 5,000 feet flying 200 miles an hour and dropping 20 Electron type bombs a second, a bomber could use up a cargo of 1,000 bombs while traveling only three miles. It might set one fire in approximately every 60 yards. If several bombers are participating in a raid, the number of fires set would increase proportionately. This arithmetic gives an idea of the problem that householders and firemen face.

The 2 pound Electron bombs are usually dropped from a height of a mile or more. They are said to reach their maximum falling velocity of 350 feet per second after they have dropped approximately a mile. Because of its light weight and relatively low velocity, such a bomb has relatively poor penetrating power as compared with larger explosive bombs. The Electron bomb will penetrate the roof deck of an ordinary wood-constructed building, but the possibilities of these small bombs penetrating to lower floors are not very great under ordinary structural conditions. Householders are advised in England, therefore, that the attic is where they may expect incendiary bomb fires to occur. For types of construction other than wood, tests have shown that a 2 pound Electron type bomb will penetrate 3½ to 4 inches of reinforced concrete, about 6 inches of sand, or earth, or ¼ inch of mild steel plate.

WHILE something can be done to make the roof of one's home or building somewhat more resistant to the penetration of these bombs, it appears doubtful if such measures are practical. Advice has been issued, however, to householders in England as to extinguishing apparatus that they should keep in the home to handle these small bombs.

When the thermite reaction is in progress the bomb cannot be smothered because the oxygen that enters into the reaction comes not from the outside atmosphere but from the iron oxide. When the thermite reaction has been completed, however, and the magnesium shell is burning, the bomb is dependent upon the outside air for its oxygen. At that stage of its burning it can be smothered.

If water is put on burning magnesium, a violent reaction may be expected. This reaction is principally what happens on a smaller scale when water is spattered on a hot stove. The water is suddenly changed to steam. When water, a liquid, turns to steam, a gas, it must expand more than 1,000 times. This sudden expansion would be much the same as an explosion.

Chemists say that hot magnesium and water produces magnesium hydroxide and free hydrogen gas:

$$Mg + 2H_2O = Mg(OH)_2 + H_2$$

Hydrogen burns readily, and mixed with air, is one of the most explosive gases known. The violent reaction of water and magnesium therefore could be, and probably is in part, a hydrogen explosion. Hydrogen is unquestionably

given off, but it probably burns as fast as it is produced, and unless the bomb is in a confined space, does not explode.

When water is put on the incendiary bomb in small quantities as with a spray, the water accelerates the production of hydrogen and the burning time of the magnesium is thus reduced. In the case of the common 2 pound magnesium bomb this time may be reduced from 10 to 15 minutes to 2 or 3 minutes.

The British authorities recommend for this size bomb the use of a spray of water from a ⅛-inch nozzle. The customary equipment for supplying this is a hand pump in a bucket operated from a distance of about 30 feet from the bomb. Water is delivered from this system at a rate not more than 1¾ gallons a minute. It is recommended that the main jet of water be played into the seat of the fire and not indiscriminately into the smoke and flame. The spray also serves to wet down the area surrounding the bomb and thus prevents the spread of fire.

In general, it is recommended that at least two persons manage this work—one at the pump and one at the nozzle.

It is emphasized that water should never be poured onto an Electron bomb from a pail or bucket. This would probably produce an explosion and injure the person using it. A spray from a common garden hose might, however, serve very nicely in place of the hand pump assembly if the water supply can be depended on.

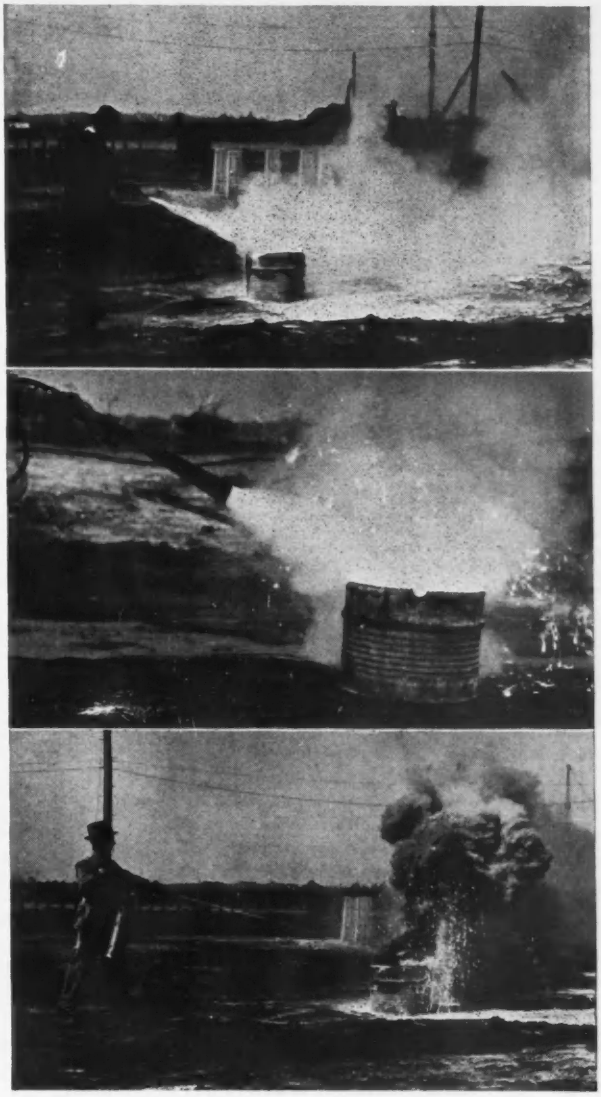
IT will be noticed that the hand bucket pump is very similar to the pump-can assembly used by many American fire departments with the exception that a small spray nozzle is used. Many American fire departments employ a 5-gallon pump can with some 15 feet of hose which would admirably serve with a small spray nozzle to handle fires in the manner recommended by the British authorities.

A spray nozzle on the end of a booster line which is common in many American fire departments might also be effectively used on these bombs.

If one of these burning bombs were to be hit by a stream from a large hose line, a violent reaction might be immediately expected. It probably wouldn't be a good idea to hit a bomb with such a stream except when the men at the nozzle were at a substantial distance from the bomb. The best technique for extinguishing a fire caused by such a bomb might very well be to put the hose stream all around the burning bomb to prevent the ignition of surroundings rather than to attempt to extinguish the fire in the bomb itself. A spray if the proper nozzle is available would probably give better results than a solid stream. However, there are probably a good many cases where a small bomb would be quickly consumed if it were hit with a standard 1½-inch hose stream from a nozzle with a ½-inch tip or larger, or if an ordinary fire department 2½-inch line with a 1-inch or larger tip were employed. The water from such streams would be going on the bomb in such quantities as to accelerate the process of burning itself out and if it can be so attacked from a distance, this may be the best thing to do.

The Electron bomb can be controlled by the use of sand and other inert materials. The bomb may be covered with sand until the glare and heat have been reduced. This can be done with a long handled scoop shovel and then the shovel used again to pick up the bomb. If it is in a building, a suitable container filled with sand may be used to take it out of the building.

Bombs which depend upon phosphorus rather than magnesium for their effective action present no special problem for their extinguishment as large quantities of water are the best thing possible.



How common extinguishers of various types would behave on magnesium bombs is shown by tests on magnesium scrap at the Everett, Massachusetts, Testing Station of Factory Mutual Laboratories. Top, dry chemical; middle, carbon dioxide; bottom, vaporizing liquid (carbon tetrachloride base). The tests covered fires in small quantities of magnesium scrap in amounts comparable to those present in magnesium bombs. A violent reaction may be expected on such fires by the use of all extinguishers of the water type (including soda-acid, calcium chloride, loaded stream, foam). None of the standard types of extinguishers would put out a fire in burning magnesium. Extinguishers can be used (with due regard to the limits of their capacity) on surrounding combustibles if streams can be kept away from the magnesium itself. The agent used successfully in these tests was powdered talc which was shoveled gently on to the burning material, forming an airtight blanket over the burning magnesium. Sand, if dry, can be similarly used. Small magnesium fires have also been extinguished with heavy lubricating oil but this method is impractical on larger quantities of metal.

Stop FIRE
Now That Winter is Just Around the Corner—We Suggest
CHECKING YOUR CHIMNEY AND REPAIR WHERE NEEDED
REMOVING ALL FIBER CLEAN AND CHECK REPLACE WHERE NEEDED
Also We Strongly Recommend the Following
1. Putting your Ashes in Metal Containers and do not let them accumulate.
2. Protect the Floors, Walls and Ceilings about your Heating Appliances.
3. Don't Start Your Fires with Kerosene (you will live longer.)
4. Don't let Paper or Trash lay around—BURN THEM DAILY in Metal Containers.
5. Do not put Rags or Paper in unused Stove Pipe Flues (use metal caps.)
6. Do not put Pennies Back of Fuses (Buy new Fuse Plugs.)
7. Always Disconnect Your Electric Appliances.
8. Do Not Clean with Gasoline—(use Non-Inflammable and Non-Explosive Cleaner.
9. Do not SMOKE IN BED.
10. Keep Your Oil Rags in Metal Containers.
REMEMBER THERE'S PROFIT IN FIRE PREVENTION.
Independent Fire Company, Inc.
Fire Prevention Bureau
By C. F. REININGER

Alert to winter fire hazards the Independent Fire Company, Inc., of Charles Town, W. Va., gives this advice to householders. The above text was passed out as a handbill and also published in both local newspapers.

Getting Ready for Winter: Chimneys

IN the year 1648 the Director-General of New York ordered the people to clean their chimneys of soot to prevent fires. This was before the time that a fire department was organized in New York City. He appointed four fire wardens to inspect every chimney and hearth in the city. When any were condemned as being foul, the owner was required to pay a fine and in case of a fire in his house resulting from his own negligence he was assessed a much heavier penalty.

People today seem to be just as careless about maintaining their heating plants as they were in the colonial days. It appears reasonable to believe that if these early practices of inspection and penalties were in force in all communities today our fire loss would be much less and runs by the fire department could be reduced about 25 percent.

This is the time of the year when alert fire departments are turning their attention to influencing people to put their heating equipment in first-class condition before the cold weather sets in. Progressive fire departments are promoting safe construction of heating plants and chimneys and are reminding the citizens in their communities that combustible materials should be safe distances from excessive heat.

Chimneys that were not thoroughly cleaned at the end of the cold weather season in the spring should be given a good cleaning now. Most people would be willing to spend the small amount of money necessary to have their chimney cleaned but they never think of it or get around to it until it is too late. Where the services of a professional chimney cleaner are not available, a common method is to lower a brick wrapped in a piece of carpet by a rope from the top of the chimney. Swinging it around inside will dislodge most of the soot.

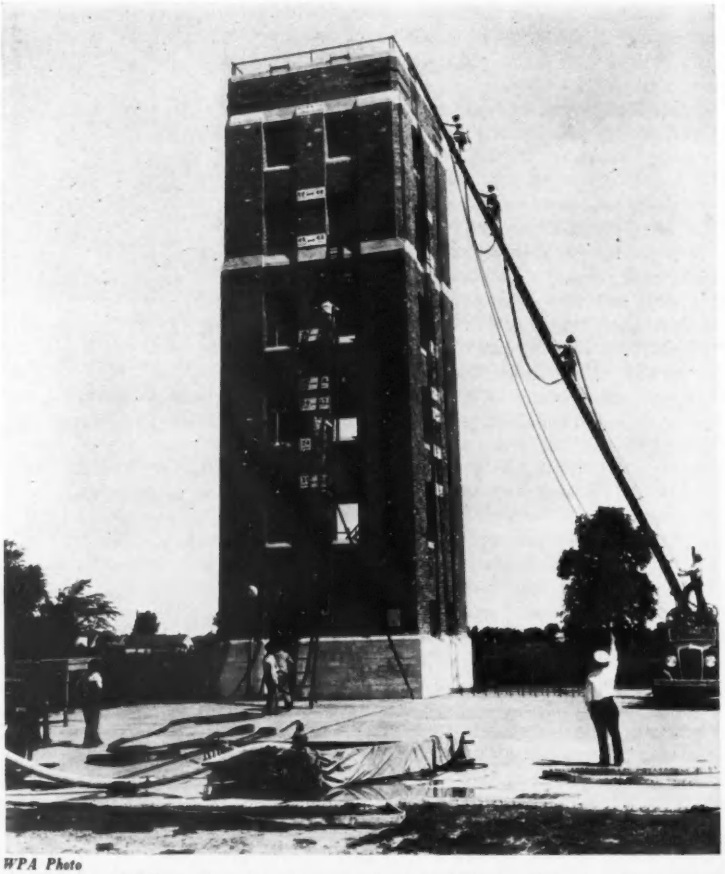
In Montreal chimney sweeps are appointed by the Board of Commissioners and every chimney is cleaned at periodic intervals. A small fee is charged the property owner. This method of keeping down the number of chimney fires has never been employed widely, but it certainly is a good plan. The town of Marathon, Wisconsin, has an ordinance which provides that in the case of a chimney fire it will be extinguished and then the fire chief will have the chimney cleaned at the expense of the owner. While this is "locking the barn after the horse is stolen" it at least prevents repetition of a chimney fire in the same house for a while and is a good lesson to the property owner.

Except in cities and towns that carry on good inspection and cleaning programs, firemen can expect to answer a number of alarms for chimney fires this fall. Many of these fires are of little consequence, but some become serious and destroy the entire dwelling or several dwellings.

The burning out of accumulated soot is dangerous because the sparks may ignite combustible roofs and the heat of such a fire may carry through the walls of a weak chimney and ignite the building. Much can be done to prevent soot from collecting by intelligent firing. If a chimney is always smoking, it is a sign that combustion is not complete and that the owner is using up fuel from which he is getting no benefit.

Some of the commonest faults in chimney construction as found by the volunteer fire companies in Lebanon County, Pa., are listed as follows by Chief Fire Marshal A. S. Stauffer of Palmyra:

1. The use of unsuitable materials which do not stand up.
2. Chimneys with bricks on edge.
3. Chimneys supported on timber construction or brackets, or insufficient masonry foundation when the chimney rests on the ground.
4. Timbers built into or against the chimney without proper insulation.
5. Chimney walls built too thin and not lined.
6. Flues that are not smoke-tight.
7. Two or more improperly arranged connections to a single flue.



WPA Photo

The city of Toledo, Ohio, has this new drill tower built by WPA at a total cost of $12,800. It is 20 feet square and 65 feet high.

8. Carelessness in sealing connections between smokepipe and chimney and failure to anchor pipe to chimney.
9. Use of badly rusted smokepipes.
10. Chimneys of insufficient height.

Getting Ready for Winter: Extinguishers

FIRE departments can save themselves many a winter run with disappointing results if they take the initiative in checking private "first aid" fire appliances. Especially they should check to see that extinguishers in unheated buildings are going to operate in cold weather. Soda acid and foam type extinguishers must be kept in heated enclosures. There are no anti-freeze solutions available that will work successfully in them.

Carbon tetrachloride, carbon dioxide, and "loaded stream" extinguishers are not affected by cold weather. Plain water extinguishers such as pump tanks can be freeze-proofed by filling with a solution of calcium chloride. The accompanying table shows the proper amount of calcium chloride for protection against various temperatures.

Fire pails and barrels are often of great value to fire departments called during the winter to fight fires in unheated buildings. These can be protected from freezing with calcium chloride. It is not necessary to refill them every winter or to change the solutions. Calcium chloride is more satisfactory than plain water for fire pail and fire barrel use even in the summer. The chemical retards evaporation by attracting moisture from the air. The solution does not weaken or deteriorate with age, it does not become foul or smell bad, and mosquitoes, which are frequently found breeding in fire pails, cannot live in calcium chloride solutions.

To Make Non-Freezing Water Solutions

The following mixtures will make 2½ gallons of a solution which will not freeze at the temperatures given. Commercial 75 percent calcium chloride (free from magnesium chloride) should be used.

Approx. Freezing Temp. °F	Water	Calcium Chloride	Specific Gravity
10°	2 gals. 1 qt.	5 lbs.	1.139
zero	2 gals. 1 qt.	6¼ lbs.	1.175
—10°	2 gallons	7 lbs. 6 oz.	1.205
—20°	2 gallons	8 lbs. 6 oz.	1.228
—30°	2 gallons	9 lbs. 2 oz.	1.246
—40°	2 gallons	10 lbs.	1.263

Getting Ready for Winter: Hydrants

SPECIAL thawing devices are carried by some departments, but the best practice is to take steps which will prevent the hydrants from freezing in the first place.

While in many communities the water department or water utility has the responsibility for the care and maintenance of hydrants, they are of first importance to the fire department. The fire department should work out with the water department a routine that will assure that the necessary steps are taken to keep hydrants operative during cold weather.

A number of departments have a regular routine of assigning a number of the members of the company to the duty of looking after certain hydrants on the town or village system. The men so assigned inspect the hydrants before cold weather to see that they drain properly and operate readily. These men also see to it that the hydrants are properly cleared of snow after a heavy snowfall so that they may be kept accessible.

MANHATTAN Fire Hose

For regular and heavy duty service made untreated or Mildew-Proof treated.

MANHATTAN
Radio-Active Treated Fire Hose
Mildew-Proof **Freeze-Proof**
Rot-Proof **Flat-Folding**

Careful drying *not* necessary.
Ready for use and immediate re-use.

Write for special bulletin.

THE MANHATTAN RUBBER MFG. DIVISION
OF RAYBESTOS-MANHATTAN, INC.
Manufacturers for Over 45 Years
53 Townsend Street Passaic, New Jersey

A Book about Record Forms Showing How to Use Them

A MODEL RECORDS AND REPORTING SYSTEM FOR FIRE DEPARTMENTS

By DeWayne E. Nolting

87 pages, size 8½x11 inches

$2.00 postpaid

This book tells the purpose and use, in all, of 27 different record forms used by fire departments. Each form is illustrated in full with details for each on size, color and paper stock. There are 7 other diagrams.

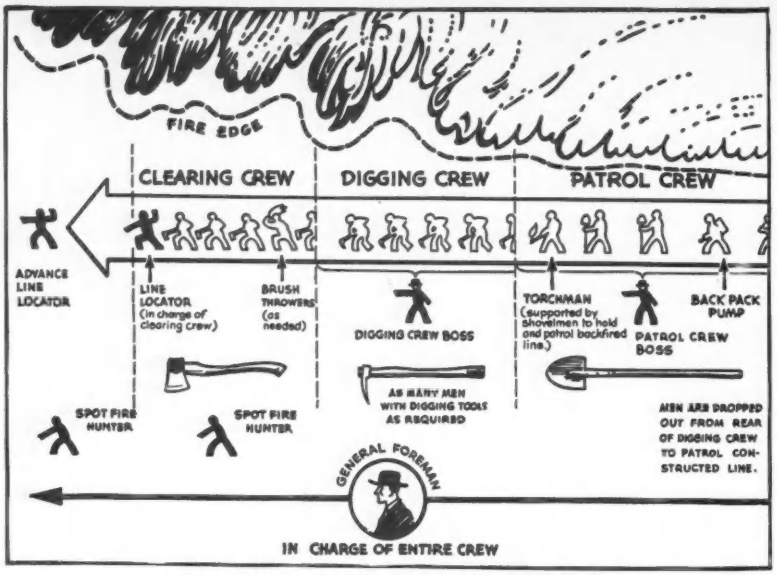
PUBLIC ADMINISTRATION SERVICE
1313 East 60th St. Chicago, Ill.

FIRE SCHOOL NOTES

In addition to the fire schools listed in the last issue of VOLUNTEER FIREMEN, there should be listed a three-day short course for firemen in the state of Maine held at Augusta in June. This was sponsored by the Educational Committee of the Maine Fire Chiefs' Association with cooperation of the State Department of Education and the State Fire Marshal. Some sixty men attended.

A successful short course for fire department inspectors was held September 17-19 at Indianapolis. This is a special school additional to the regular firemen's training work in Indiana and is the second such school this year sponsored by the Indiana Fire Service Training Schools program which is a joint effort of the Engineering Extension Department of Purdue University, the Indiana Fire Marshal's Department and the Indiana Inspection Bureau.

Ontario's second provincial school for the training of fire chiefs and firemen will be held at the University of Toronto for the four-day period October 30 to November 2. In addition to this annual short course and programs of regional schools, a class of about twenty firemen are being given a six-day special course. The men are municipal firemen who have been enlisted for service in the Royal Canadian Air Force. This is the second such group trained this year. These men are detailed to air training depots where they are placed in charge of fire protection and are responsible for training ground personnel in the handling of pumpers, crash trucks, chemical apparatus, sprinkler systems and other protection.


FIRE EDGE
CLEARING CREW
DIGGING CREW
PATROL CREW
ADVANCE LINE LOCATOR
LINE LOCATOR (in charge of clearing crew)
BRUSH THROWERS (as needed)
DIGGING CREW BOSS
TORCHMAN (supported by shovelmen to hold and patrol backfired line.)
BACK PACK PUMP
PATROL CREW BOSS
AS MANY MEN WITH DIGGING TOOLS AS REQUIRED
SPOT FIRE HUNTER
SPOT FIRE HUNTER
MEN ARE DROPPED OUT FROM REAR OF DIGGING CREW TO PATROL CONSTRUCTED LINE.
GENERAL FOREMAN
IN CHARGE OF ENTIRE CREW

ORGANIZATION FOR ONE LICK METHOD

A Method for an Orderly Attack on Forest Fires

STOPPING a forest fire is accomplished in most cases by establishing a line up to which the fire may burn, but no farther. Such a line is usually a road, a stream or other break. In the absence of such a barrier, a strip must be cleared of underbrush and other low growth. The usual practice includes digging a small trench to provide a positive break in the combustible material in which otherwise fire could spread.

The establishment of this line is a prime necessity to control of the fire. Often, the forest fire may be of such intensity that it cannot be closely approached. At this control line, however, a "back-fire" may be started. Such a secondary fire, kept under control, is allowed to burn toward the main fire. When the fires join, they have burned themselves out.

In theory it is as simple as that. Actually, fast, desperate work is often required to establish the control line. This work divides itself into three main steps. These are clearing, digging and patrol. To this work three groups of fire fighters are assigned.

The clearing crew, carrying axes and pick axes, blazes a trail by cutting away brush, slashing branches, and clearing away dead trees. This is the first step in the construction of the control line. Any natural fire barriers such as rocks and streams are considered part of this line. Therefore by careful planning of where the line will be located, much work will be saved.

The digging crew carries on the next phase of the work, which is the actual establishment of the control line. Work consists of exposing to the trail a strip of mineral earth 12 to 18 inches wide.

Men assigned to the patrol crew execute the final phase of the fire fighting work. They are equipped with torches, shovels and back-pack pumps. Those with torches light a back fire between the control line and the main blaze. Others with shovels and back-pack pumps center their activities around keeping the back fire from jumping the control line. A few drop behind at intervals and remain to patrol the worked-over area.

All of this requires organization and planning. Men must be thoroughly acquainted with the work they will do. The extent to which fire damage is kept down depends on the time it takes to bring men into action and the speed with which they work.

In an effort to utilize efficiently the available man power in fighting forest fires, the Division of Fire Control, U. S. Forest Service, has developed the "One Lick" method for fighting forest fires.

The one lick method is simply a scheme whereby each member of the clearing crew and the patrol crew does "one lick" of work, advances one or two steps and repeats the process. Men are assigned to separate squads and work in single file. As they move along, they always keep their same relative position. There is no waste motion for the men move together as a team, each one realizing that his efforts are a part of the whole. They have to go over the ground only once to establish control of the fire.

To see how the one lick method works, let us imagine that the crews are assembled at an actual fire.

The leaders of the organization plan their general strategy. As can be seen from the accompanying illustration, the advance line locator is in direct charge of the route that the crews will follow in surrounding the fire. His is the responsibility of selecting such a trail that by the time the patrol crew is ready to do its work, the fire will still be far enough away for them to effectively operate. A general foreman takes complete responsibility for the fire fighting crews. He plans when the men will be fed, given water and rested.

When crews are assembled and equipped, each line locator follows his advance line locator and begins blazing the trail. This man cuts a branch here and there, thus indicating where the clearing crews will work. Directly upon the heels of the first crew follows the digging crew. Squads move as fast as is efficient for the required job. Men remain far enough apart so they will not injure one another with their swinging tools. The patrol crew bringing up the rear takes up its rear guard activities. In its work of patrolling the area so that the main fire will not jump the control line, the patrol crew is assisted by spot fire hunters. These men circulate in the vicinity of the control line and extinguish all small fires which may be started by flying brands and sparks from the main fire.

Thus in well-ordered formation, this fire fighting force moves along. It doesn't have to back-track as the necessary work has been done in the "one lick."

A patrol crew has to keep the main fire and backfire from jumping the control line. Back pack pumps like the above are important in this work.

PUBLICATIONS

Disaster and War Emergency Planning. Report of a Sectional Committee on Disaster Emergencies, J. J. McElligott, Chairman (Educational Bulletin No. 2. 52 pages. 15 cents). International Association of Fire Chiefs, 24 West 40th St., New York, N. Y.

Care and Maintenance of Sprinkler Systems. A pamphlet of instructions to property owners and managers showing them how to keep automatic sprinkler systems in operating condition. A pamphlet which firemen during inspections of sprinklered buildings might leave for the guidance of those responsible for the property. Prepared by the Committee on Automatic Sprinklers (32 pages. 5 cents, $4.00 per 100). National Fire Protection Association, 60 Batterymarch St., Boston, Mass.

Hours of Work of Municipal Firemen in the United States. A pamphlet showing how the two-platoon and other systems for the rotation of firemen's working days operate (U. S. Department of Labor, Serial No. R.1141. 16 pages). U. S. Bureau of Labor Statistics, Washington, D. C.

ANNOUNCEMENTS

A new catalogue, "Air Raid Alarm Systems," issued by the Gamewell Company, Newton Upper Falls, Mass., is illustrated with photos and diagrams showing "Diaphone" Public Alarm equipment.

Carpenter Mfg. Co., 179 Sidney St., Cambridge, Mass., has developed a "Hot Spot Detector." Shaped like a small movie camera, it may be pointed at a wall to locate fire traveling in spaces between studding. It works on the "electric eye" principle.

Mine Safety Appliances Co., Pittsburgh, Pa., calls attention in Bulletin FA-63 to the M.S.A. Fire Blanket, protection for clothing aflame. They recommend this device for use in plants where hazardous processes may imperil the worker. It consists of a large fireproofed woolen blanket contained in a vertical wall case. In an emergency the victim simply graps a rope loop provided and turns himself around. As he does so the case opens and the blanket wraps the person from head to foot, extinguishing the flames.

Burgess Laboratories, 20 North Wacker Drive, Chicago, Ill., announces a new and bright portable lantern. It is smaller than a man's hand, weighs less than five pounds and is said to be so powerful that a newspaper may be read by the light of its beam at a distance of one half mile.

TOWN OF HARRINGTON, MAINE
OFFICE OF SELECTMEN

July 17th, 1940

Linwood Bradley,
Fyr-Fyter Products,
New York City

Dear Mr. Bradley:

We have received the first shipment of supplementary hose, 150 ft., and the extinguisher and light for our new LaBour Trailer fire apparatus. You may be interested to know that we had occasion to use the apparatus on Sunday, June 30th and that it functioned perfectly and saved us a bad fire in the middle of the town.

The roof of the barn of the large 2½ story Coffin house just below the Post Office caught fire from some premature July 4th fireworks some young boys were setting off. The shingle roof was burned through to the hayloft before the fire was discovered. The boys and men on the Square rushed the Trailer across the street by hand, hooked onto the hydrant, and in almost no time had 130 lbs. pressure on the pump and a good stream on the fire. In a few minutes it was all out.

We are congratulating ourselves that we accepted the Trailer you had with you, rather than waiting for the shipment of a new one from the factory, as we were doubtless saved a bad fire. We are well satisfied with this first real demonstration of the LaBour apparatus.

Yours truly
Walter S. Coffin, Chairman

LABOUR FIRE TRAILER
THE LABOUR COMPANY, INC.
1569 Sterling Avenue
Elkhart, Indiana, U. S. A.

THE FIRST CALL IN RESUSCITATION
THE LAST WORD IN SUCCESSFUL RESULTS

The H-H INHALATOR

The world's most popular and widely-used instrument for resuscitation of persons overcome by gas; electric shock; drowning and similar hazards is the H-H Inhalator—compact, portable, safe and easily operated. Approved by the Association of Police and Fire Surgeons, the American Gas Association, and officially accepted by the Council on Physical Therapy of the American Medical Association, the H-H Inhalator is the finest aid to respiratory rescue the fireman can employ.

Let us arrange a thorough demonstration for the members of Your Department!

Mine Safety Appliances Company
Braddock, Thomas and Meade Sts.
Pittsburgh, Pa.

SPECIFY FEDERAL SIRENS

for assurance of quality

SPECIFY a TRAFFIK-KING

Combination Siren and Oscillating Light
FOR THE BEST

VISIBLE and AUDIBLE WARNING SIGNAL

Federal Electric Co., Inc.
8717 S. State St. Chicago, Ill.

The "Model A" Super

Which Every Volunteer Fire Department Should Know About

Every volunteer Fire Department should know the exclusive qualities of this first-aid extinguisher which experience shows should be the first to be carried into any fire because:—

FIRST:—
It is safe to use on electrical fires. Fyr-Fyter fluid is not only a powerful fire extinguishing fluid, but a most certain insulation—safeguarding the operator against serious injury or possible death from electrical contact.

Both 1 Quart and 1½ Quart Sizes

AND SECOND:—
It is effective on concealed fires in walls and other "hard to reach" locations and is effective also on fires in greases, oils and the more flammable liquids.

SALESMEN WANTED

If you are interested in adding to your income by spare time work or in building a permanent business for yourself without investment in stock, fixtures, etc., write for our new Dealer's Plan to

THE FYR-FYTER COMPANY
Dept. 20-59 DAYTON, OHIO

$10.00-$3.00-$2.00 EACH MONTH

PYRENE PRIZE LETTER CONTEST

● **IT'S EASY TO WIN!!!**
Have you ever put out a fire with a fire extinguisher? If you have, you can put yourself in line for a cash prize.

● **WRITE A LETTER**
That is all that you have to do. Just write us about an experience where an approved extinguisher of any make did good work in stopping a fire.

● **RECEIVE $10.00 FOR 250 WORDS**
You can, by winning first prize. Decide to be one of the three firemen this month who will take home a cash prize by simply relating an experience with any approved fire extinguisher in this contest sponsored by the Pyrene Manufacturing Company of Newark, N. J., and VOLUNTEER FIREMEN.

● **NO RED TAPE . . . .**
No fancy writing, no formality — merely send your entry to the address given below.

FIRST PRIZE—$10.00

FRED A. TAYLOR, *Chief*
Colorado Springs Fire Department
Colorado Springs, Colorado

Owned Extinguisher 28 Years

The other day an elderly gentleman came into the fire station with an ancient carbon tetrachloride type fire extinguisher and told of extinguishing a fire at his home. He wanted the extinguisher refilled. It seems his kitchen range had become overheated and the partition behind the stove had started to burn. The extinguisher stopped the fire.

What interested us most was his statement that he had owned this extinguisher twenty-eight to thirty years, having purchased it shortly after he was married and started housekeeping. This was the first time he had ever used it, the original fluid being in it. I tried the extinguisher, a 1-quart unit, and as it was in good working order we refilled it for him.

SECOND PRIZE—$3.00

W. T. BENNETT
Laurel Fire Department
Laurel, Delaware

Knocks Down Sparks on Roof

When our company arrived at a country fire one day last August, we found a farm tenant house too far gone to save with the very small water supply at hand. A large barn was near the dwelling and the dry roof showed small spots of fire. It was impossible to drench so much space with our booster line and the limited water supply. Burlap bags soaked in water were used on the spots of flame but this was a slow process.

Finally, two firemen fastened a rope around their bodies and passed it over the peak of the roof where it was tied on the opposite side. They were thus able to walk on the roof and carry two 2½-gallon soda-acid hand extinguishers. In this way a spark or ember was spotted as soon as it fell and it was possible to save the barn. With the aid of a spare extinguisher, the two others were kept in service.

THIRD PRIZE—$2.00

EVERETT G. MORRISON, *Secretary*
Santa Paula Fire Department
Santa Paula, Calif.

Extinguisher in Car Important

Driving home from Los Angeles, we noticed the car ahead smoking. We had just made the customary remark suggesting that they were burning coal in the car ahead when flames started to show under it.

It took just a few seconds to roll up alongside the other car and motion it to stop. The occupants of the car piled out. I pulled in ahead and in a few seconds had my 2-quart carbon tetrachloride extinguisher working.

The fire had resulted from combustible material being used in repairing the muffler. This had ignited grease accumulations under the car floor boards.

This is the third time I have thus used an extinguisher. An extinguisher is as important to me in my own car as it is to our regular equipment.

CONTEST RULES

1. Contestants in the Pyrene Prize Letter Contest must be members of their local fire department.

2. Letters are to describe actual experiences where an approved fire extinguisher of any make has saved lives or property.

3. Trade names may be used but will be deleted in publication. Publishers reserve the right to edit winning letters to permit publication.

4. Each contestant automatically vouches for the truth of the facts presented from his own or others' experience.

5. Only one letter may be submitted each month.

6. Letters must be legibly written in ink or typewritten on white paper, one side only. Preference will be given to letters not over 250 words in length.

7. Letters received after the 8th of the month will be judged in following month's competition.

8. Monthly prizes in cash will be: 1st, $10.00; 2nd, $3.00; and 3rd, $2.00.

9. Address contest letters to Pyrene Prize Letter Contest, National Fire Protection Association, 60 Batterymarch St., Boston, Mass.

Announcing

THE NEW NINTH EDITION CROSBY-FISKE-FORSTER HANDBOOK OF FIRE PROTECTION

Going to press soon will be another edition of the Crosby-Fiske-Forster Handbook of Fire Protection, *the* engineering handbook of the fire protection field. But the Handbook isn't for fire protection engineers only. It's equally valuable to fire officers, firemen, insurance engineers, students of fire protection, and many others. It gets this wide distribution because it contains answers to all questions and problems which continually confront those who are fighting to reduce the annual fire loss.

The 9th (1940) edition of the Handbook has been completely revised through the conscientious efforts of more than 100 recognized authorities in various types of fire protection work. Scientific and engineering improvements of the last five years have been incorporated in its 1200 pages to make it complete. Likewise, information that has become obsolete in the last five years has been weeded out.

The Crosby-Fiske-Forster Handbook is the standard technical reference volume in the fire protection field, the basis of education for beginners and a constant companion of experienced men specializing in fire protection and fire prevention. Be among the first to receive a copy.

NATIONAL FIRE PROTECTION ASSOCIATION

Here's what they said about the EIGHTH EDITION:

" . . . the most comprehensive compilation of accepted information which has been assembled in one manual . . . "

" . . . a splendid piece of editorial and typographical work . . . "

" . . . well arranged, all inclusive, well illustrated, and very readable . . . "

" . . . a valuable handbook which should be in the hands of all fire department officers . . . "

" . . . in compact form the most essential information on fire prevention and fire protection that has crystallized into good practice . . . "

POST PAID $4.50

Date.....

NATIONAL FIRE PROTECTION ASSOCIATION
60 Batterymarch Street, Boston, Mass.

Please send me.....copies of the Ninth Edition of the Crosby-Fiske-Forster Handbook of Fire Protection, for which $.....($4.50 per copy, postpaid) is enclosed. I understand that the Handbook will not be off the press for a few weeks yet.

Name.....

Address.....

10.40V

Where a "penny wise" policy caused the loss of this

$250,000 SCHOOL

A Six Hundred Dollar Investment Might Have Saved This

THE officials of a certain town in Maine turned down the suggestion to install an automatic alarm system connected with the fire department circuits as too exorbitant. The cost would have been only $600.

This fire was first noted by a citizen who ran past six alarm boxes to the fire station causing another of those DELAYED ALARMS. When the firemen did arrive the interior of the school was a mass of flames and the roof had caved in.

No community can have too many conspicuously and accessibly placed fire alarm boxes. This precaution will save precious minutes and cut down fire losses appreciably.

Check up on conditions in your locality - recommend that automatic alarm systems be installed in all schools and important buildings. Gamewell engineers will advise you.

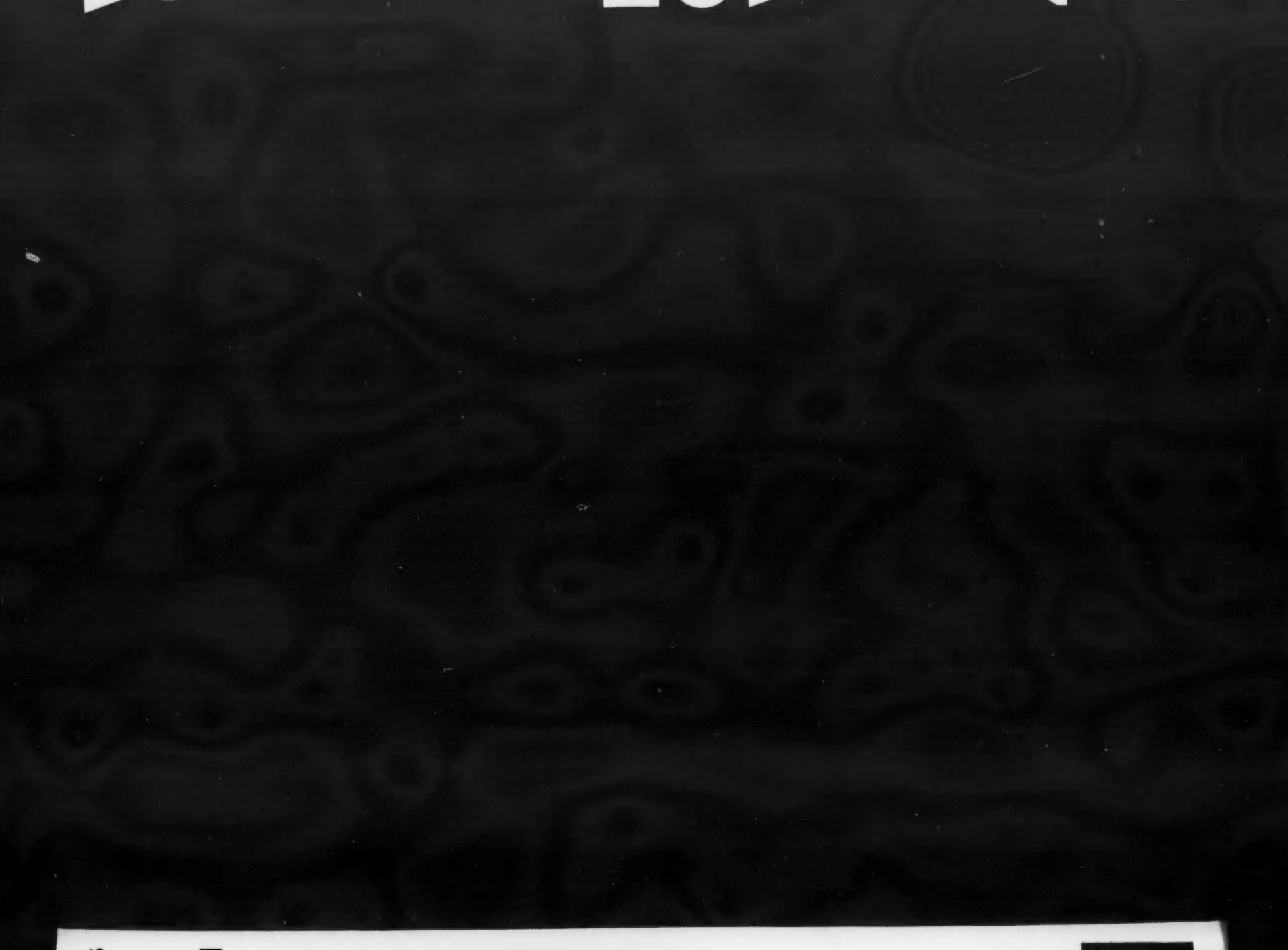
GAMEWELL VITAGUARD

for volunteer fire departments

A simple and economical fire alarm system consisting of one or two wire loops, street boxes and the DIAPHONE public alarm.

It costs practically nothing to operate and it requires no manual control or winding.

Write for interesting examples of what VITAGUARD has accomplished for many towns supporting volunteer departments.

THE GAMEWELL COMPANY

NEWTON UPPER FALLS, MASSACHUSETTS